Appendix F
Kevlar Wire Rope

F-1. Corps of Engineers Experience with Kevlar Wire Rope

a. Huntington District. The Huntington District (April 1997) uses Kevlar wire rope for Stoney (roller slide type) gates at three lock and dam projects. Each project has four of these gates. In each case the 3/4-in. diameter Kevlar rope was a replacement for steel wire rope. The hoisting machinery and sockets were not changed.

(1) London Locks. The Kevlar wire rope has been in service since 1992. No failures have occurred.

(2) Marmet Locks. The Kevlar wire rope has been in service since 1992. The ropes on one of the gates failed during November 1995 after approximately 20,000 operations. The valve was not damaged. The ropes' appearance changed prior to failure. The cause of failure was judged to be fatigue.

(3) Winfield Locks. The Kevlar wire rope has been in service since 1993. The ropes on one of the gates failed during January 1997. The valve was not damaged. However, the failure was considered serious as repositioning of the valve was judged to be effort which could be dangerous to the personnel involved. The failure appeared to be initiated as result of a rope's sheath becoming misshaped and getting tangled with a previous wrap on its spiral drum. During unwinding, the rope began winding in a reverse direction.

(4) Comments. Personnel at the Huntington District have decided the remaining spare Kevlar rope will be used for immediate replacement of any failed rope, but eventually the Kevlar rope will be replaced with stainless steel rope. The Kevlar rope gave better service than the original steel rope. Part of the corrosion problem with the original steel rope was that it used stainless steel sockets resulting in galvanic corrosion.

b. Walla Walla District. The Walla Walla District (April 1997) uses Kevlar wire rope for the radial lock gates at the Lower Granite project. The gate is operated 1,000 to 1,500 times per year. It was previously fitted with a 1-in. diameter stainless steel wire rope which had failed in as quickly as 6 months. The apparent mode of failure was fatigue from bending as the portion of the rope making the tightest bend on the spiral drum was the first to fail. At this time the Kevlar ropes had been in service for 4-5 years without a failure. Note that the spiral drums were modified slightly to reduce abrasion to the rope.